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EMS Case Reports from Emergency Medicine Residents

Dr. Dan O'Donnell

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DEPARTMENT OF EMERGENCY MEDICINE

Division of Out-of-Hospital Care
School of Medicine

**EMS Case Reports:
IU School of Medicine
Department of Emergency
Medicine
EMS Track Residents**

Dan O'Donnell, M.D.

Associate Professor Emergency Medicine

Disclosures

- No disclosures for any speakers.

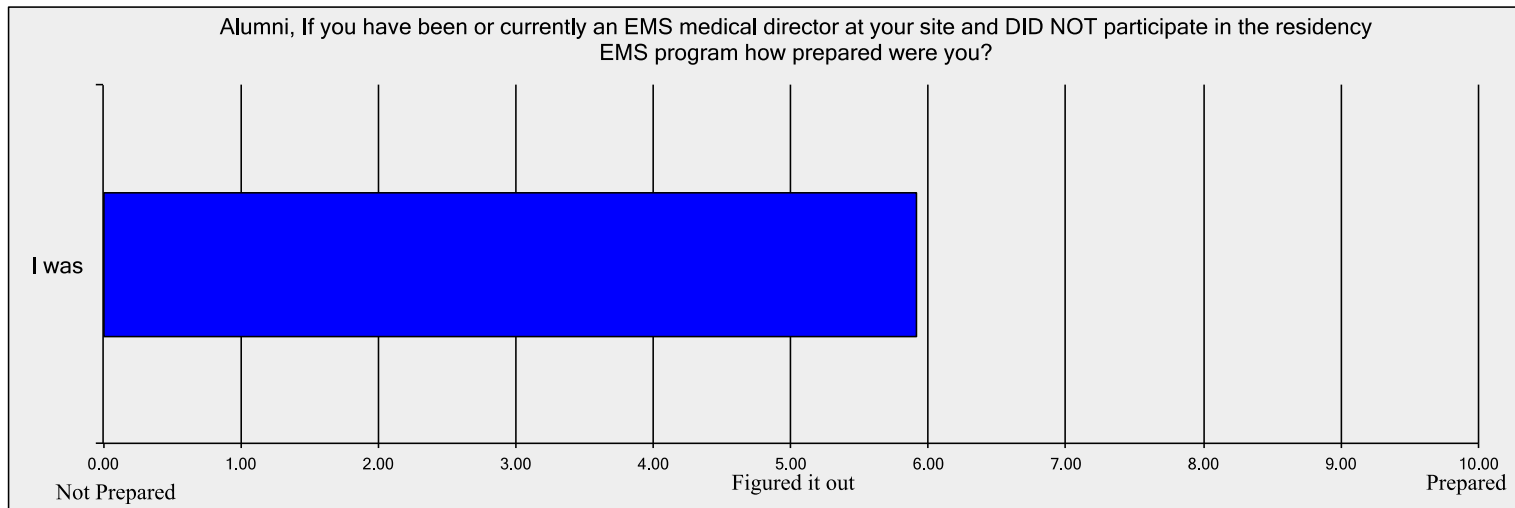
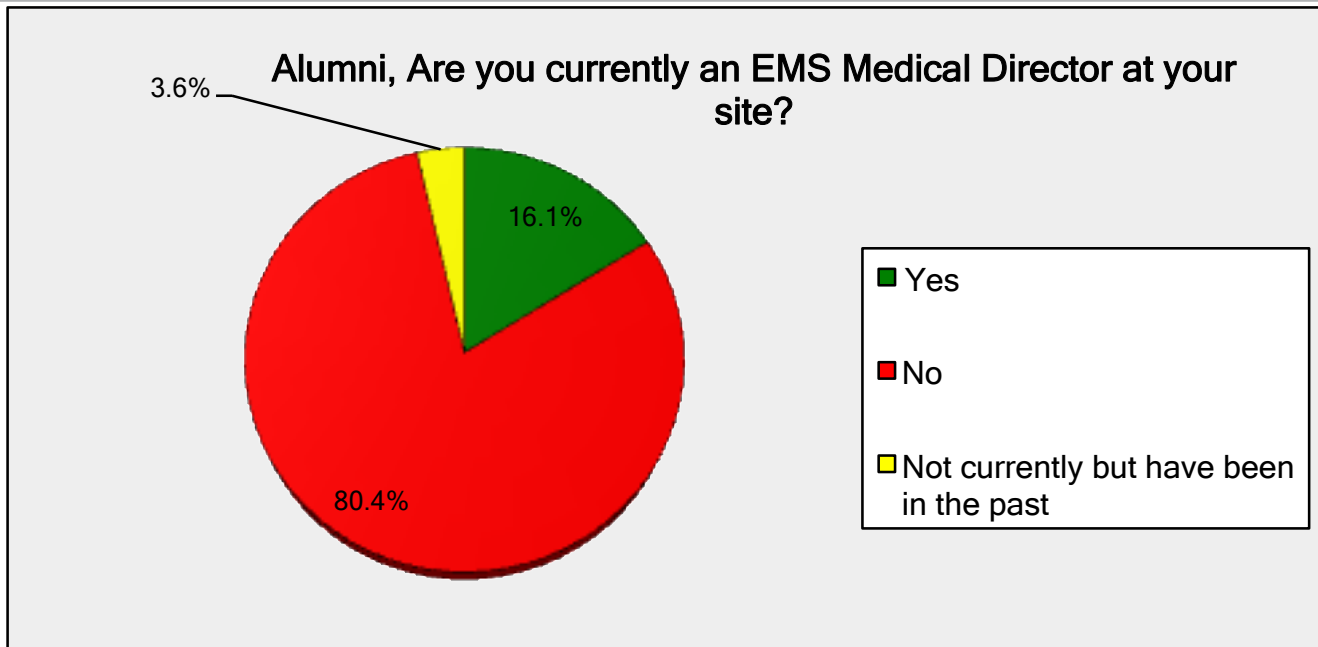
Longitudinal Emergency Medical Services Track Curriculum For Emergency Medicine Residents Improves EMS Medical Direction Career Placement

Andrew Stevens MD, Dan O'Donnell MD, Charlie Miramonti MD, Michael Olinger MD
Division Out of Hospital Care, Indiana University School of Medicine, Indianapolis,
Indiana

The Journal of Emergency Medicine. August 2011; 4(2): 207.

INTRODUCTION

- All residency trained emergency medicine (EM) physicians participate in mandated emergency medical services (EMS) education.
- Often EM physicians are asked to assume medical director roles.
- We hypothesized that longitudinal EMS resident education provides a better model for career sustaining EMS medical director concepts.



METHODS

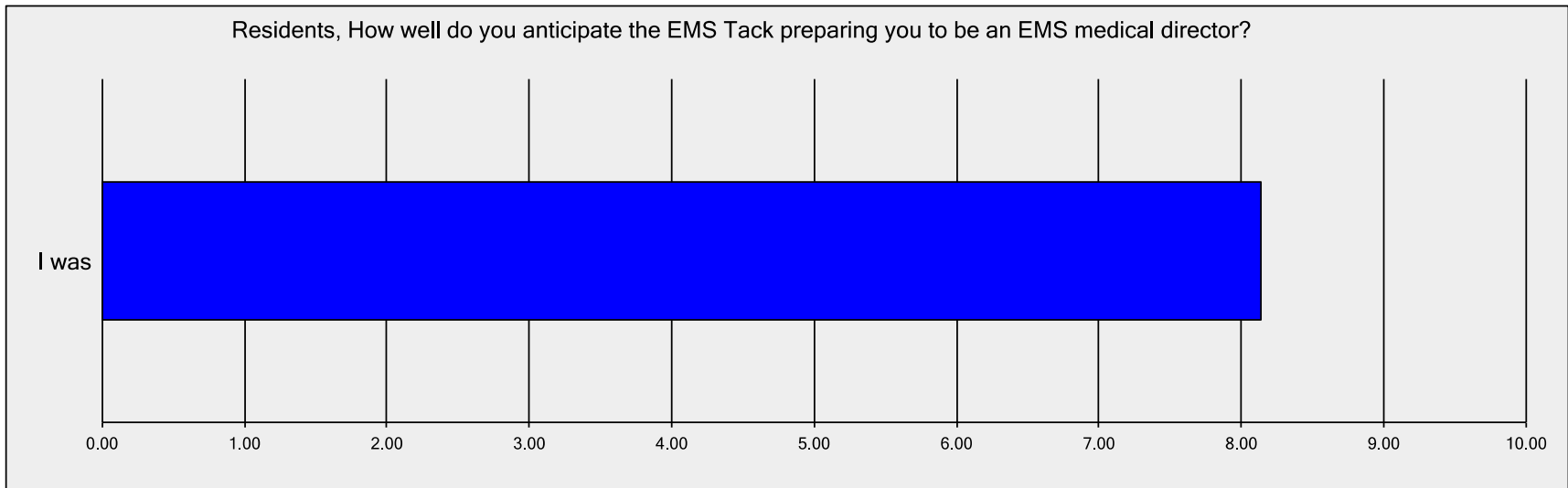
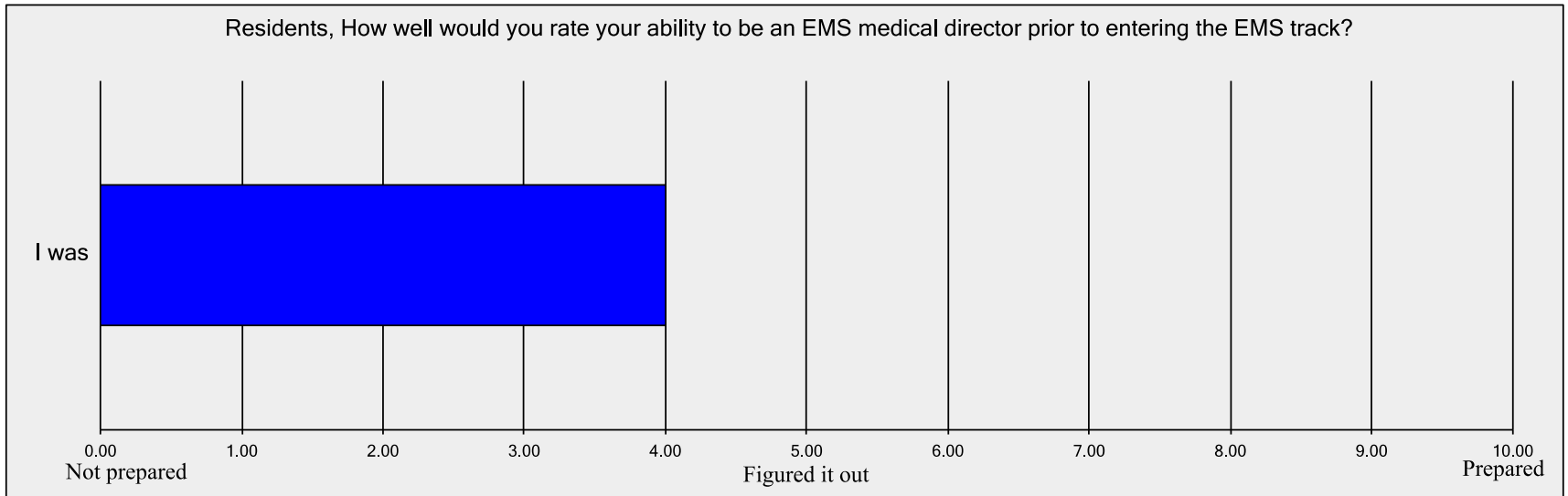
We designed a survey to assess baseline EMS medical directorship participation. The survey was electronically administered to a cohort of EM alumni from a single academic EM institution. Survey feedback was utilized in developing a novel curriculum in 2010. This longitudinal EMS track curriculum requires residents to assume a 2-year EMS medical directorship in a large urban EMS system. Graded experience is acquired through the following components:

1. Active member of a resident-paramedic pre-hospital ambulance unit (PGY-2)
2. Independent pre-hospital supervisory provider unit (PGY-3)
3. Participation in an EMS subspecialty niche
 - i) Motorsports Medicine
 - ii) Tactical EMS
 - iii) Mass Gathering Medicine
 - iv) Aeromedicine
4. Quarterly meetings, improvement projects, faculty mentors
5. Completion of scholarly and administrative projects
6. Completion of the National Association of EMS Physicians-Medical Directors' Course as a capstone experience

We surveyed alumni and residents to evaluate the effectiveness of this curriculum on EMS aptitude.

Department of Emergency Medicine





RESULTS

Pre Track Survey: 56 alumni participated in the survey (37% response rate) of these, 11 (19%) self identified as EMS medical directors.

Post Curriculum: Thirty-Two residents have completed the EMS track curriculum from 2010 to 2015 and of these, 24 (75%, $p < 0.0001$) were successfully placed. Fifteen (63%) as EMS medical directors and 9 (37%) as fellows post graduation

CONCLUSIONS

- Longitudinal EMS track curricula with graded responsibilities provides a better model to teach director skills during residency.
- This model enhances EMS career development and better prepares emergency medicine resident graduates for fellowship and medical director roles.

The future...



Class of 2017: 18 of 20 (90%) participation in the EMS Track



Sting to the Heart? A Case of Kounis Syndrome

Brian Miller, M.D.

PGY3, Indiana University

Emergency Medicine Residency

Dispatched to Allergic Reaction

- 68 year old male working in the yard stung by swarm of bees
- Wife reports he collapsed and had a “seizure”



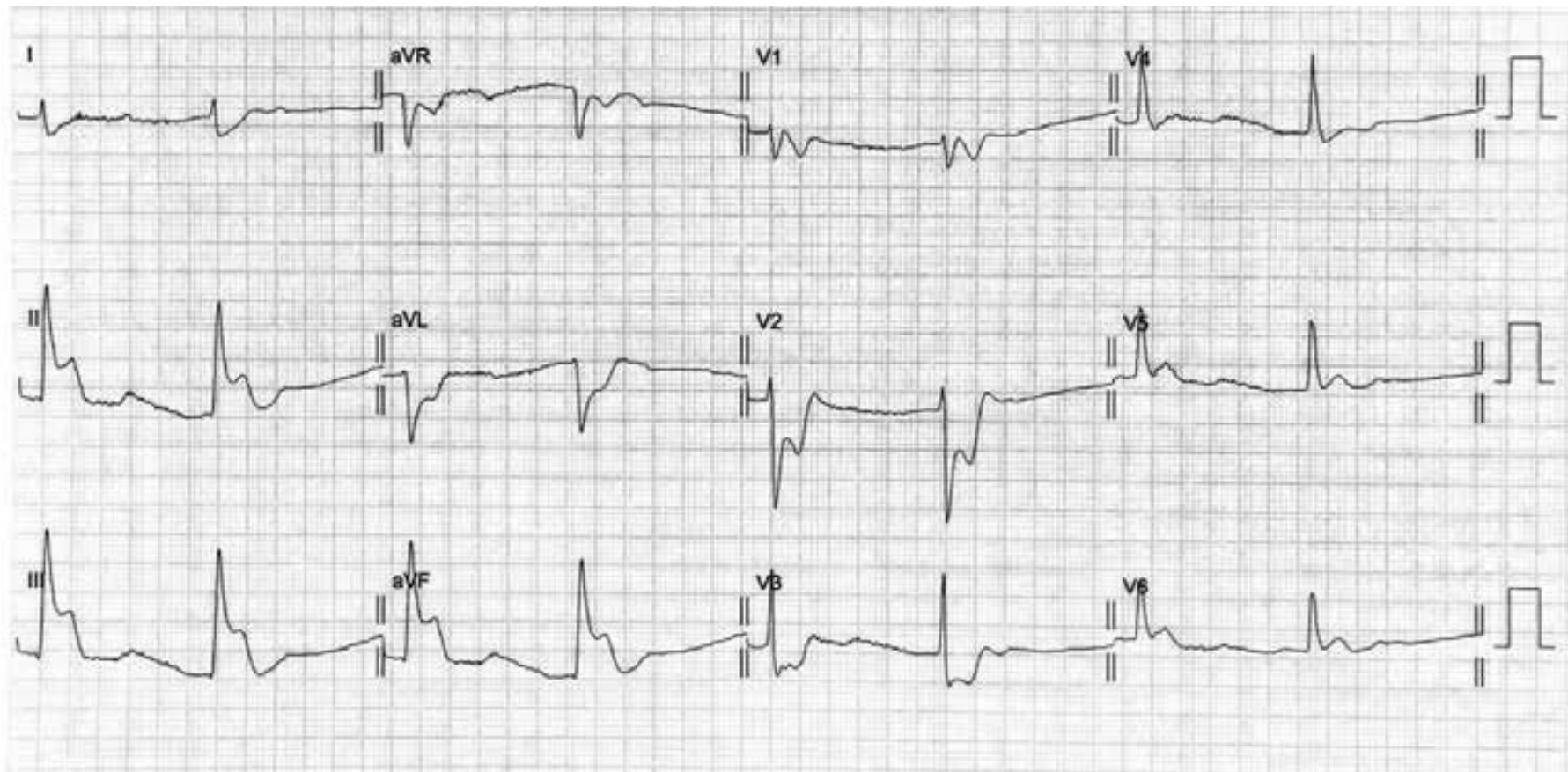
- Ill appearing patient supine with nearly agonal respirations
- History per wife:
 - No hx of anaphylaxis or reaction to bees
 - History of CAD with prior stents and COPD
- OPA placed, BVM respirations initiated and patient transferred to the ambulance



PHYSICAL EXAM

- Neuro: Moaning, PERRL, GCS 8
- Pulm: Agonal breaths, clear BBS
- CV: BP 78/52, HR 50-60's, thready distal pulses
- ABD: soft and non-tender
- Skin: cool, clammy/ diaphoretic, flushed

EKG obtained...



What would you do now?



Interventions

- Bilateral 16ga IVs established
- Normal saline boluses started
- No meds given enroute
- 2nd EKG with V4R shows rhythm Δ SB \rightarrow ST
- Spont respirations increase with BVM vent
- Receiving hospital notified of STEMI alert

ED Course

- Patient intubated shortly after arrival to the ED
- Aggressively fluid resuscitated
- Given ASA, NTG, and IM epinephrine
- Repeat EKG showing STEMI
- Initial troponin elevated @ 0.7
- Interventional Cardiology consulted and recommended serial troponins and delayed cardiac cath until more stable

Hospital Course

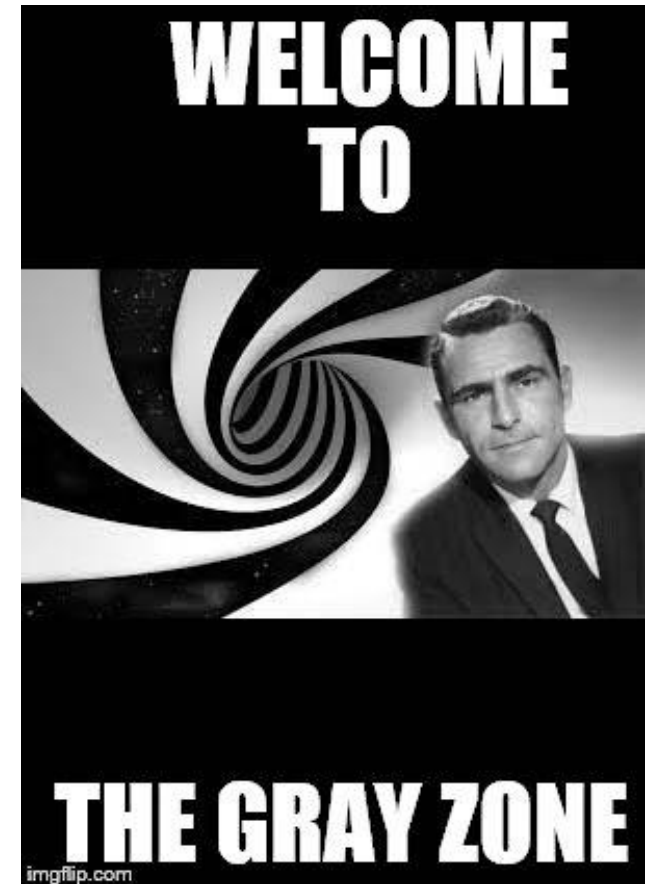
- ECHO showed normal left ventricular function and no focal wall motion abnormalities
- Troponin peaked at 1.0
- Serial EKGs showed resolving ST Elevation
- Extubated next day
- Cath on HD #5 – Patent stents, no sig occlusions

Case Resolution

- Discharge Diagnoses:
 - Anaphylaxis
 - Coronary vasospasm
- Follow up arranged with allergy & immunology specialists for bee/ wasp allergy testing

Discussion

- Multiple problems occurring concurrently
 - Anaphylactic shock
 - ACS
 - Respiratory Failure
 - AMS
- Blending of Protocols



Discussion

- Treatment dilemma
 - Anaphylaxis treatment?
 - ACS treatment?
 - Both?



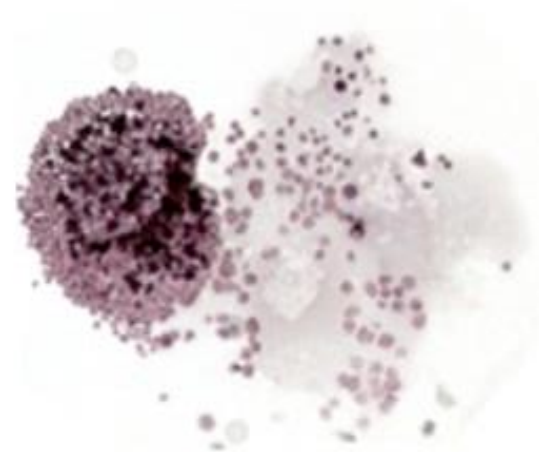
*To Epi
Or
Not To Epi?
That is the
question...*

Kounis Syndrome

- “Allergic angina” or “Allergic MI”
- Occurrence of ACS with hypersensitivity reactions following allergic exposure
- Causes:
 - Drugs
 - Foods
 - Insect Stings
 - Environmental exposures

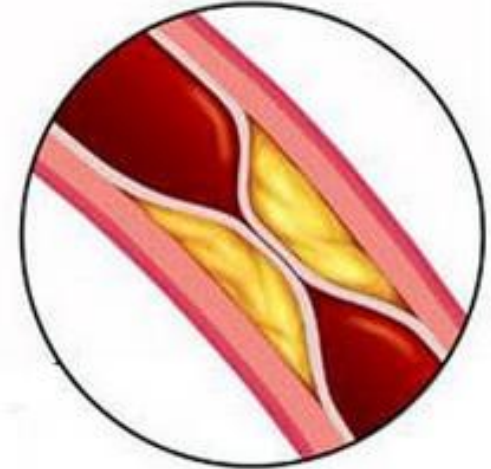
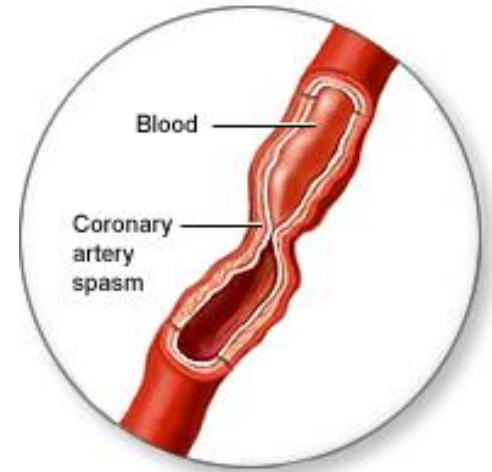
Kounis Syndrome

- Pathophysiology
 - Allergen exposure
 - Mast cell degranulation releases pro-inflammatory mediators
 - Histamine/ leukotrienes → vasospasm
 - Tryptase/ chymase → plaque rupture/ erosion



Kounis Syndrome

- **Types:**
 - **Type 1 variant (w/o CAD)**
 - No CVD RF or coronary lesion
 - Coronary Vasospasm
 - **Type 2 variant (w/ CAD)**
 - Previous atherosclerotic dz
 - Vasospasm or Acute Thrombosis
- *Type 3 variant - Stent thrombosis



Kounis Syndrome

- Diagnosis
 - Clinical Recognition – Allergic Rxn + ACS
 - Testing
 - ECG
 - Cardiac enzymes
 - ECHO
 - Cath
 - Follow up allergic testing

Kounis Syndrome

- Treatment
 - Delicate balance of treatment of both the ACS and allergic reaction components

Kounis Syndrome

- Management of Anaphylaxis
 - Epinephrine
 - May aggravate ischemia & worsen coronary vasospasm
 - Life saving drug no absolute CI in anaphylaxis
 - Consider in any serious reaction
 - Delay shown to increase mortality
 - H1/H2 Blockers, Steroids, Fluid Resuscitation



Kounis Syndrome

- ACS Management
 - Aspirin
 - Nitrates with caution in hypotension
 - Avoid Morphine – consider Fentanyl
 - O2 for sat <90%

Take Home Points

- Kounis syndrome = Allergic MI
- Can cause vasospasm or thrombosis - transport to facility with a cath lab
- Treat both components
- Do not hesitate to give epinephrine



Case: Dyspnea after Naloxone

**Jason Saunders, M.D.
EM-Peds PGY-4, Indiana University
Emergency Medicine**

911 Call

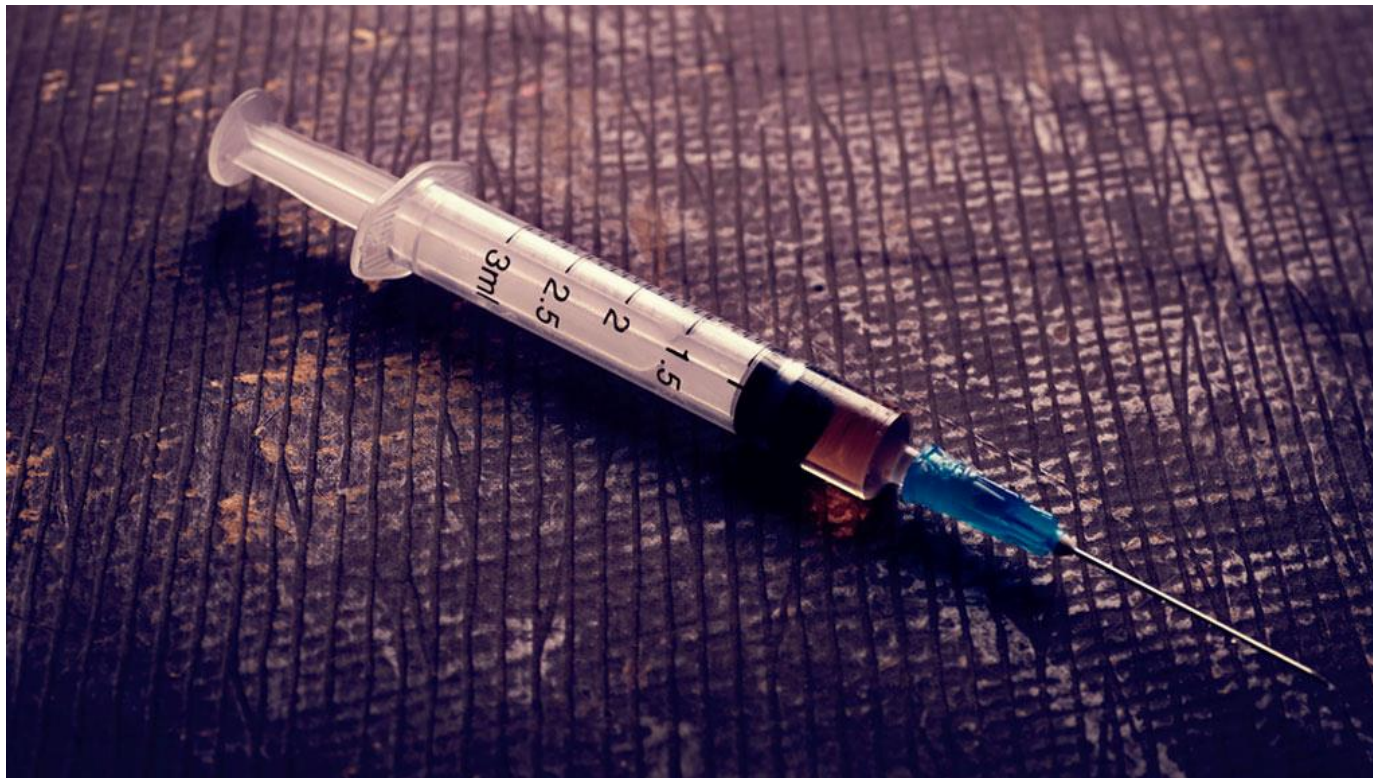
- EMS called for a 35 year old female with heroin OD, not responsive
- IMPD administered Naloxone 2 mg IN prior to EMS arrival



On Scene

- Awake and alert, RR ~ 20
- Admits to IVDA just prior to the call
- 10 minutes later, complains of dyspnea
- No history of any cardiopulmonary disease
- RR now 30, HR 121
- SpO₂ 86% RA → 91% on 100% NRB
- Appears uncomfortable, short sentences
- Diffuse expiratory wheezing/crackles

What's going on?



Naloxone

- Common pre-hospital opioid antagonist
- Wide spread use with minimal training
- Regarded as safe with few adverse effects

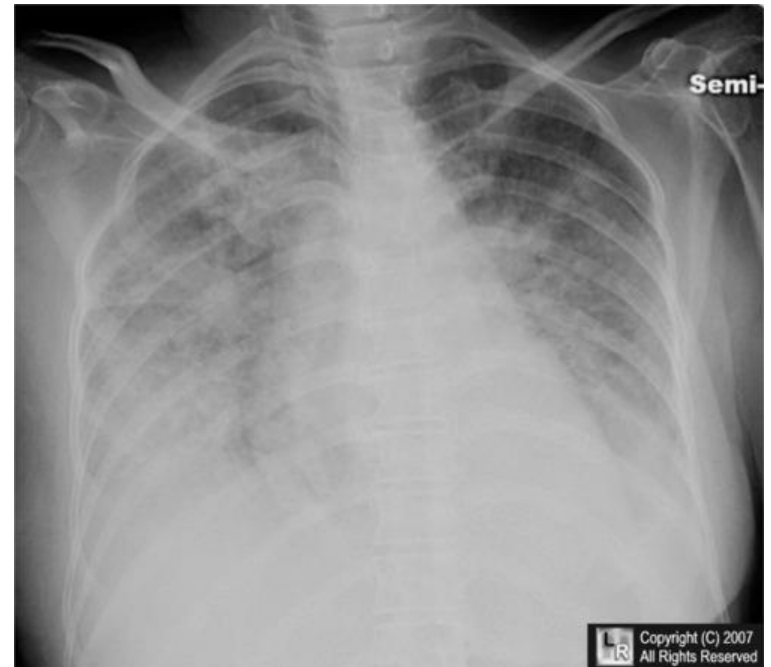


Naloxone

- Adverse Effects
 - HTN
 - Ventricular arrhythmias
 - Cardiac arrest
 - Seizures
 - **Pulmonary edema**

Naloxone-Induced Pulmonary Edema

- Possible Mechanisms
 - ☞ ↑ Catecholamines
 - ☞ ↑ Lung permeability
 - ☞ ↑ Inflammation
- Rapid IV push?



RECOGNITION IS KEY!

- Rare but **real** phenomenon
- Must recognize pulmonary edema to treat
- Non-cardiogenic (BNP, echo normal)
- Follow local pulmonary edema protocols
 - i.e. Nitro, CPAP
- Treatment is supportive

Take Home Points

- Recognize!
 - May become more common
- Slow push
- Treatment

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Breech Delivery

A case-based presentation



Nathan Whitmore, MD
PGY-3 IU Emergency Medicine
EMS Case Presentation
August 26, 2016



Disclosure

- There are no relevant financial relationships to disclose
- The content of this lecture was developed following an extensive literature search and is the most up to date, evidence-based information available
- This case and some of the slides and pictures were supplied to me by **Michael McNutt. Thanks!**

Dispatch

- IEMS and IFD are dispatched to a residence for a female in active labor
- Enroute, dispatched notified the crew that the a leg was presenting from the mother's birth canal!





OB Kit Contents

- **Sterile gloves**
- Drape Sheet
- Gauze sponges
- Disposable towels
- 2 Alcohol preps
- 2 OB towelettes
- **Bulb syringe**
- **Receiving blanket**
- **2 Umbilical clamps**
- 2 Nylon tie-offs
- **Scalpel**
- OB pad
- **Plastic bag**
- Twist ties
- **Infant cap**
- 2 Wrist ID bands

Scene



Scene & Delivery

- IFD arrives to find mother in a bathroom on hands and knees with lower half of body in a bathtub. Her husband seated behind her holding the baby level with perineum
- Legs and buttocks delivered, but head and arms are still in the birth canal!



Breech Delivery

- Buttocks or feet presenting closest to the cervix
- 1/25 live births
- 3 categories of breech delivery

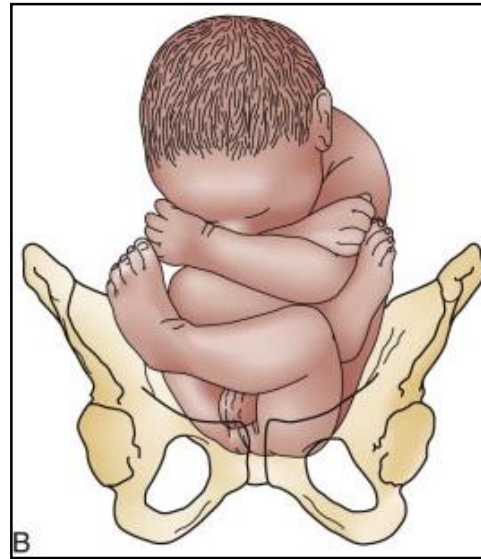


Categories of Breech Delivery

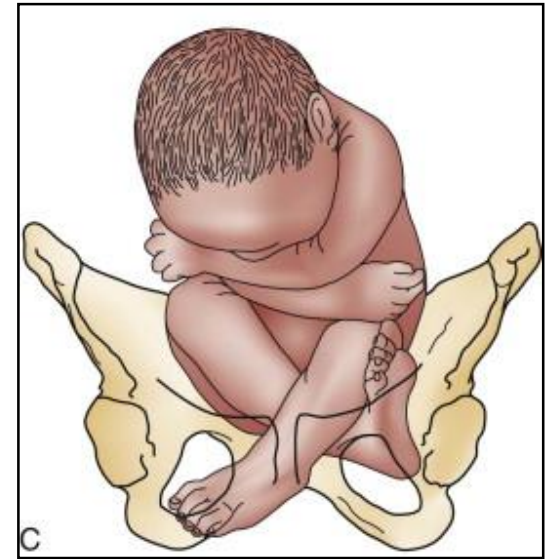
Frank



Complete



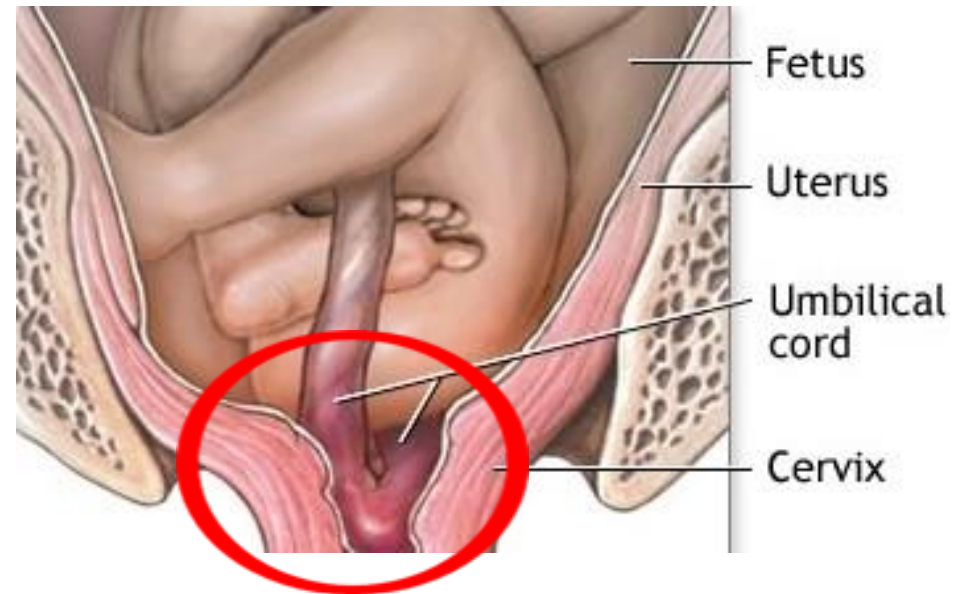
Incomplete



Why do we care?

Complications

- Asphyxia/hypoxia
- Death
- Head and neck trauma
- Shoulder dislocation
- Broken bones
- Brachial plexus injuries



Scene & Delivery (cont.)

- EMS arrives, EMT took father's place behind mother and noted the baby's skin was pale and unable to feel pulsation in the umbilical cord
- Hand was inserted in vagina to remove pressure from the cord
- Several contractions later, no progression made.

What do you do NOW?

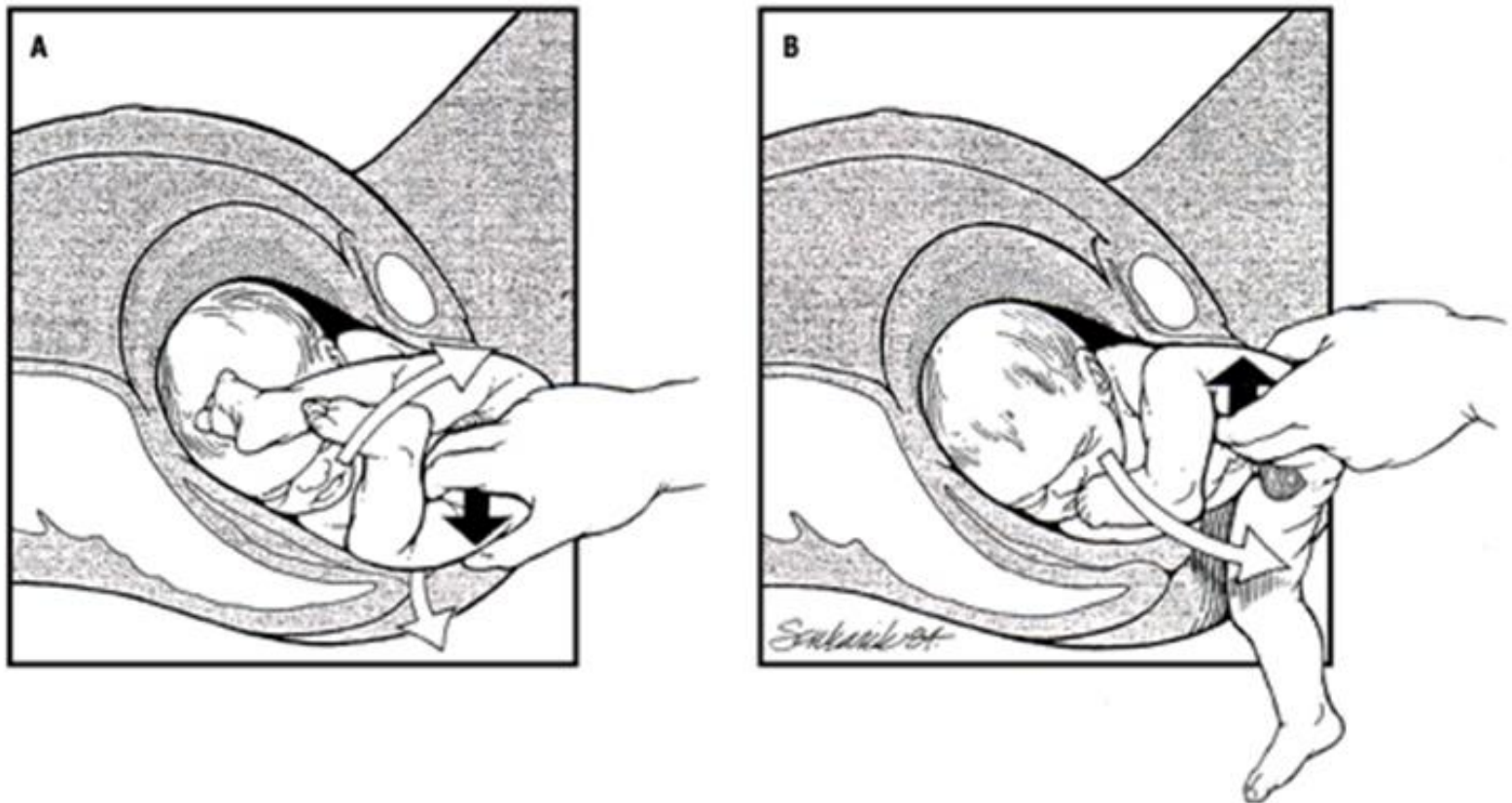


Stay or Transport?

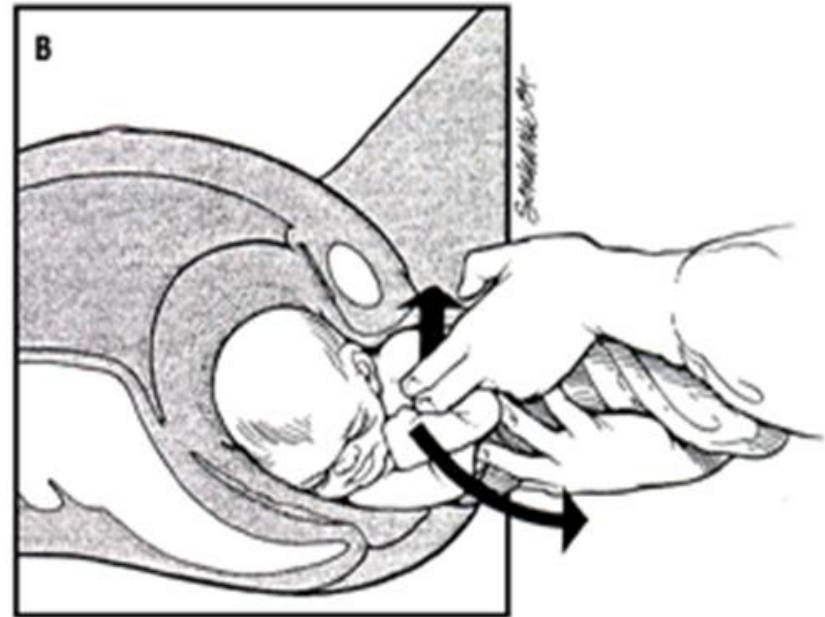
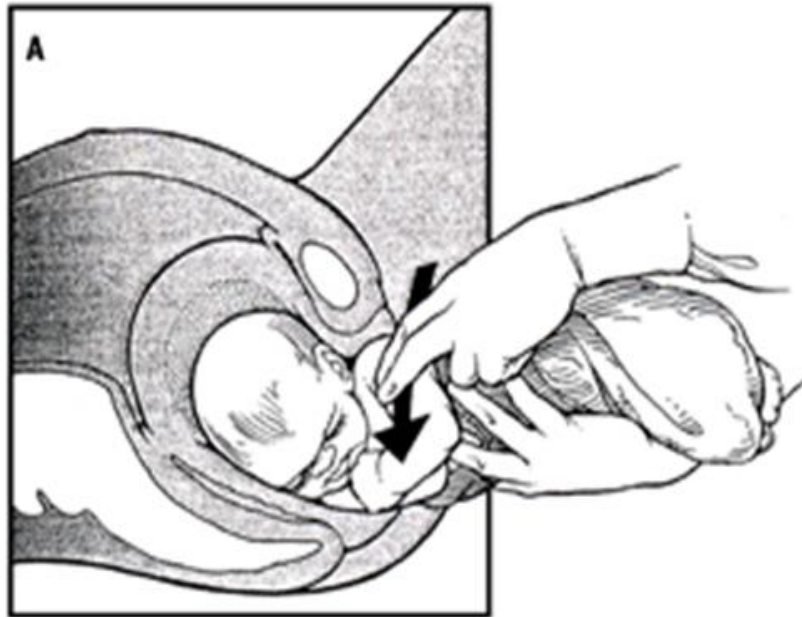


How do you deliver a breech baby?

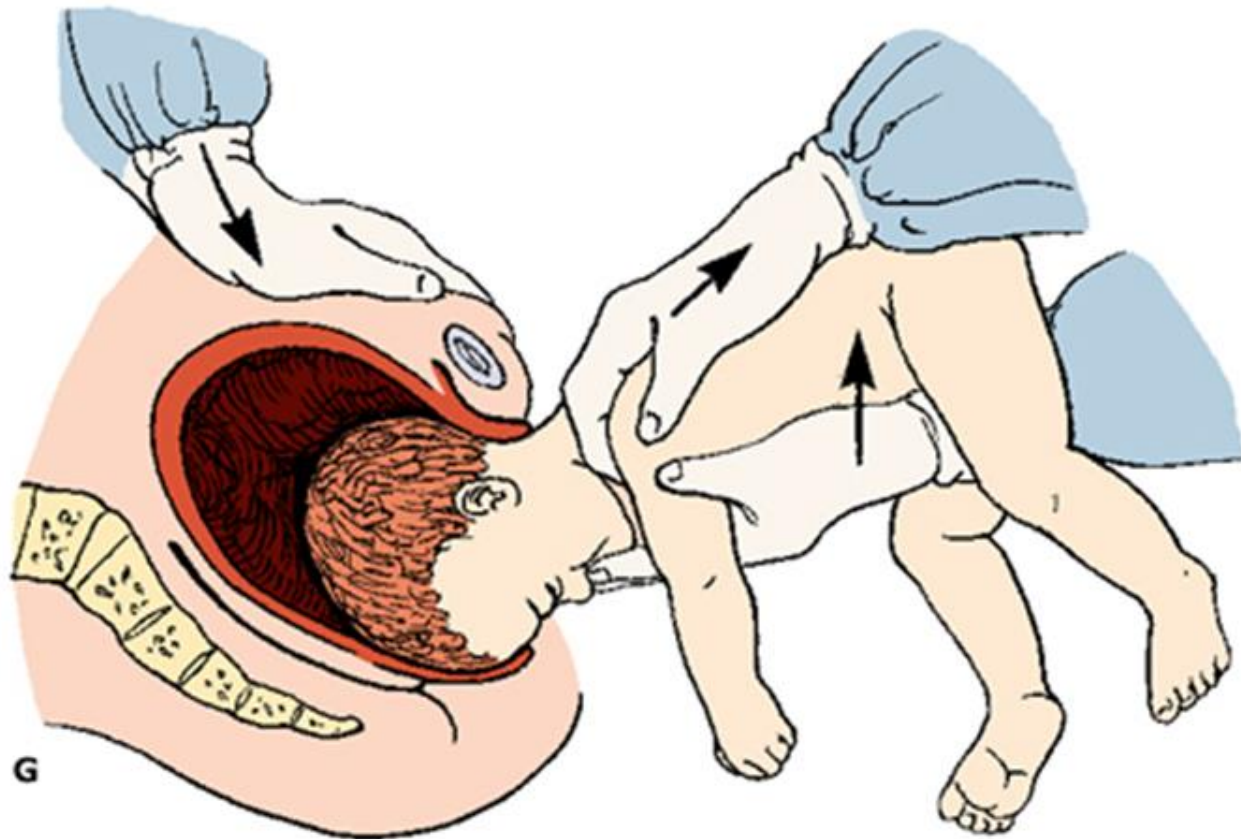
Delivering a Breech Baby



Delivering a Breech Baby



Delivering a Breech Baby (in color)



Scene & Delivery (cont.)

- While being packaged in the ambulance, the delivery progressed and the arms delivered.
- Head is still in birth canal!

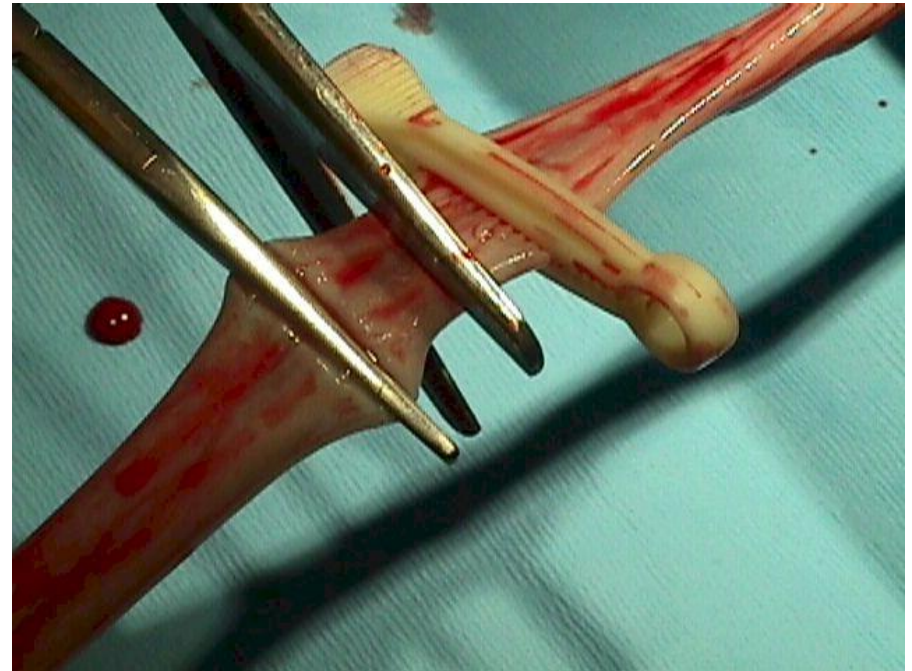


Stay or Transport?



Scene & Delivery (cont.)

- Crew made the decision to stay and assist with delivery completion and while waiting for more help to arrive
- Umbilical cord was clamped and cut by dad!



Scene & Delivery (cont.)

- Baby was noted to be **blue, warm, and limp!**
- No meconium staining noted
- Suctioned nose and mouth



Scene and Delivery (cont.)

- Warmed, dried, and stimulated with **NO response!**
- **HR 40 bpm!**
Compressions and BVM ventilations initiated at a 5:1 ratio (per protocol)



APGAR Scoring Chart

SIGN	0	1	2
ACTIVITY	Limp	Some extremity flexion	Good extremity flexion
PULSE	Absent	<100	≥100
GRIMACE	Absent	Some facial grimace	Strong grimace
APPEARANCE	Blue	Blue extremities, pink torso	All pink
RESPIRATORY EFFORT	Absent	Weak cry	Strong cry

APGAR = 1

Transport

- Unsuccessful IO attempt x 2
- IV access eventually established
- After 7 minutes of CPR, HR increased to 140 bpm and compressions ceased



Transport

- No respiratory effort, so ventilations continued
- Skin started to pink up on arrival to hospital



Thoughts?

Follow-up

- Pt was eventually transported to Riley Children's Hospital
- Underwent Hypothermia Protocol
- Developed seizures and started on AED's



Follow-up

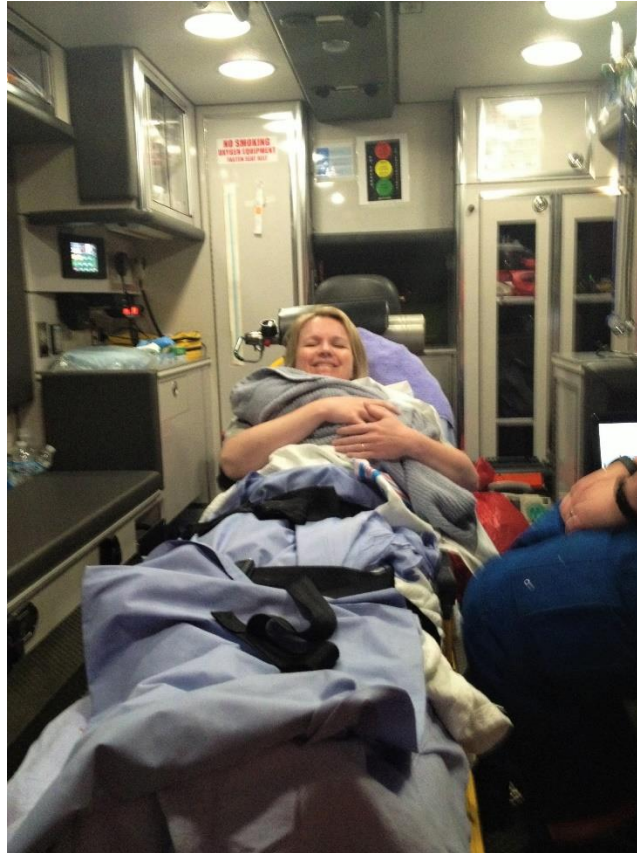
- Discharged home on hospital day 12 and noted to be feeding well!



Take Home Points

- Bring your OB kit with you to every potential delivery and know what's in it!
- Breech isn't as uncommon as you think. Be prepared!
- Know how to adapt and realize the decision to stay or transport can change depending on the circumstances and know your resources.

Questions?



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